direction of the control transmitter). The protected TV station locations in this paragraph are the locations of record as of September 1974, and these do not change even though the TV stations may have been subsequently relocated.

(i) The protected TV station locations are as follows:

| Control transmitter frequency range | Protected TV station location |
|---|---|
| 470–476 MHz. | Washington, DC 38°57′17″ 77°00′17″ |
| 476–482 MHz. | Lancaster, PA 40°15′45″ 76°27′49″ |

(ii) The distance to the radio horizon is calculated using the following formula:

$$d = \sqrt{17 \times h}$$

where

d is the distance to the radio horizon in kilometers

h is the height of the antenna center of radiation above ground level in meters

### § 22.627 Effective radiated power limits.

The effective radiated power (ERP) of transmitters operating on the channels listed in § 22.621 must not exceed the limits in this section.

(a) *Maximum ERP.* The ERP must not exceed the applicable limits in this paragraph under any circumstances.

| Frequency range (MHz) | Maximum ERP (watts) |
|---|---|
| 470–512 | 1000 |
| 928–929 | 50 |
| 932–933 | 30 |
| 941–942 | 600 |
| 952–960 | 150 |

(b) *470–512 MHz limits.* The purpose of the rules in paragraphs (b)(1) through (b)(3) of this section is to reduce the likelihood that interference to television receiption from public mobile operations on these channels will occur. The protected TV station locations specified in this section are the locations of record as of September 1974, and these do not change even though the TV stations may have been subsequently relocated.

(1) *Co-channel protection.* The ERP of control transmitters must not exceed the limits in the tables in paragraphs (b)(1)(ii) and (b)(1)(iii) of this section. The limits depend upon the height above average terrain of the control transmitter antenna and the distance between the control transmitter and the nearest protected TV station location in paragraph (b)(1)(i) of this section.

(i) The protected TV station locations are as follows:

| Control transmitter frequency range | Protected TV station location | | |
|---|---|---|---|
| 470–476 MHz | Jacksonville, IL | 39°45′52″ | 90°30′29″. |
| | Mt. Pleasant, MI | 43°34′24″ | 84°46′21″. |
| | Oxford, OH | 39°30′26″ | 84°44′09″. |
| | Washington, DC | 38°57′17″ | 77°00′17″. |
| 476–482 MHz | Champaign, IL | 40°04′11″ | 87°54′45″. |
| | Madison, WI | 43°03′01″ | 89°29′15″. |
| | Parkersburg, WV | 39°20′50″ | 81°33′56″. |
| | Fort Wayne, IN | 41°05′35″ | 85°10′42″. |
| | Lancaster, PA | 40°15′45″ | 76°27′49″. |
| 482–488 MHz | South Bend, IN | 41°36′26″ | 86°27′48″. |
| 488–494 MHz | Philadelphia, PA | 40°02′30″ | 75°14′24″. |
| 494–500 MHz | | | None. |
| 500–506 MHz | Johnstown, PA | 40°19′47″ | 78°53′45″. |
| 506–512 MHz | Washington, DC | 38°57′49″ | 77°06′18″. |
| | Waterbury, CT | 41°31′02″ | 73°01′00″. |

(ii) Table E–3 and E–4 apply to control transmitters in the New York–Northeastern New Jersey and Cleveland urban areas that transmit on channels in the 476–482 MHz range and to control transmitters in the Detroit urban area that transmit on channels in the 482–488 MHz range.

(iii) Tables E–5 and E–6 apply to all control transmitters except those to which Tables E–3 and E–4 apply.

(2) *Adjacent channel protection.* The ERP of control transmitters must not exceed the limits in Table E–7. The limits depend upon the height above average terrain of the control transmitter antenna and the distance between the control transmitter and the nearest protected TV station location listed in this paragraph. The protected TV station locations are as follows:

| Control transmitter frequency range | Protected TV station location | TV channel |
|---|---|---|
| 470–476 MHz: | Hanover, NH 43°42′30″ 72°09′16″ ..... | (15) |
| | Madison, WI 43°03′01″ 89°29′15″ ..... | (15) |
| | Champaign, IL 40°04′11″ 87°54′45″ ... | (15) |
| | San Diego, CA 32°41′48″ 116°56′10″ | (15) |
| | Lancaster, PA 40°15′45″ 76°27′49″ .... | (15) |
| | Parkersburg, WV 39°20′50″ 81°33″56″. | (15) |
| 476–482 MHz: | South Bend, IN 41°36′20″ 86°12′44″ .. | (16) |
| | Pittsburgh, PA 40°26′46″ 79°57′51″ ... | (16) |
| | Mt. Pleasant, MI 43°34′24″ 84°46′21″ | (14) |
| | Scranton, PA 41°10′58″ 75°52′21″ ..... | (16) |
| 482–488 MHz: | Hanover, NH 43°42′30″ 72°09′16″ ..... | (15) |
| | Fort Wayne, IN 41°05′35″ 85°10′42″ .. | (15) |
| 488–494 MHz: | Salisbury, MD 38°24′15″ 75°34′45″ .... | (16) |
| 494–500 MHz: | Philadelphia, PA 40°02′30″ 75°14′24″ | (17) |
| 500–506 MHz: | Washington, DC 38°57′49″ 77°06′18″ | (20) |
| 506–512 MHz: | Harrisburg, PA 40°20′44″ 76°52′09″ ... | (21) |

(c) *Los Angeles area.* This paragraph applies only to control transmitters in the Los Angeles urban area that utilize an antenna height of 457 or more meters (1500 or more feet) above mean sea level. The ERP of such transmitters must not exceed the following limits:

| Antenna height AMSL in meters (feet) | ERP (Watts) |
|---|---|
| 457 (1500) to 610 (2000) | 155 |
| 611 (2001) to 762 (2500) | 100 |
| 763 (2501) to 914 (3000) | 70 |
| 915 (3001) to 1067 (3500) | 50 |
| 1068 (3501) to 1219 (4000) | 40 |
| 1220 (4001) to 1372 (4500) | 30 |
| 1373 (4501) and above | 25 |

TABLE E–3.—MAXIMUM ERP (WATTS) FOR CONTROL TRANSMITTERS (HAAT 152 METERS OR LESS)

| Distance to protected TV station in kilometers (miles) | Antenna height above average terrain in meters (feet) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 15 (50) | 30 (100) | 46 (150) | 61 (200) | 76 (250) | 91 (300) | 107 (350) | 122 (400) | 137 (450) | 152 (500) |
| 209 (130) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 201 (125) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 850 | 750 | 725 |
| 193 (120) | 1000 | 1000 | 1000 | 1000 | 900 | 750 | 675 | 600 | 550 | 500 |
| 185 (115) | 1000 | 1000 | 800 | 725 | 600 | 525 | 475 | 425 | 375 | 350 |
| 177 (110) | 850 | 700 | 600 | 500 | 425 | 375 | 325 | 300 | 275 | 225 |
| 169 (105) | 600 | 475 | 400 | 325 | 275 | 250 | 225 | 200 | 175 | 150 |
| 161 (100) | 400 | 325 | 275 | 225 | 175 | 150 | 140 | 125 | 110 | 100 |
| 153 (95) | 275 | 225 | 175 | 125 | 110 | 95 | 80 | 70 | 60 | 50 |
| 145 (90) | 175 | 125 | 100 | 75 | 50 | ..... | ..... | ..... | ..... | ..... |

See § 22.627(b)(1)(ii). This table is for antenna heights of 152 meters (500 feet) or less above average terrain. For antenna heights between those in the table, use the next higher antenna height. For distances between those in the table, use the next lower distance.

TABLE E–4.—MAXIMUM ERP (WATTS) FOR CONTROL TRANSMITTERS (HAAT MORE THAN 152 METERS)

| Distance to protected TV station in kilometers (miles) | Antenna height above average terrain in meters (feet) | | | | | |
|---|---|---|---|---|---|---|
| | 152 (500) | 305 (1000) | 457 (1500) | 610 (2000) | 762 (2500) | 914 (3000) |
| 209 (130) | 1000 | 447 | 219 | 117 | 71 | 46 |
| 193 (120) | 500 | 209 | 95 | 50 | 30 | 19 |
| 177 (110) | 225 | 91 | 35 | 19 | 11 | 8 |
| 161 (100) | 100 | 30 | 10 | 5 | 3 | 2 |
| 153 (95) | 50 | 13 | 5 | 3 | 2 | 1 |

See § 22.627(b)(1)(ii). This table is for antenna heights of more than 152 meters (500 feet) above average terrain. For intermediate values of height and/or distance, use linear interpolation to obtain the maximum permitted ERP.

TABLE E–5.—MAXIMUM ERP (WATTS) FOR CONTROL TRANSMITTERS (HAAT 152 METERS OR LESS)

| Distance to protected TV station in kilometers (miles) | Antenna Height Above Average Terrain in meters (feet) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 15 (50) | 30 (100) | 46 (150) | 61 (200) | 76 (250) | 91 (300) | 107 (350) | 122 (400) | 137 (450) | 152 (500) |
| 261 (162) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 257 (160) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 800 |
| 249 (155) | 1000 | 1000 | 1000 | 1000 | 1000 | 875 | 775 | 700 | 625 | 575 |
| 241 (150) | 1000 | 1000 | 950 | 775 | 725 | 625 | 550 | 500 | 450 | 400 |
| 233 (145) | 850 | 750 | 650 | 575 | 500 | 440 | 400 | 350 | 320 | 300 |
| 225 (140) | 600 | 575 | 465 | 400 | 350 | 300 | 275 | 250 | 230 | 225 |
| 217 (135) | 450 | 400 | 335 | 300 | 255 | 240 | 200 | 185 | 165 | 150 |
| 209 (130) | 350 | 300 | 245 | 200 | 185 | 160 | 145 | 125 | 120 | 100 |
| 201 (125) | 225 | 200 | 170 | 150 | 125 | 110 | 100 | 90 | 80 | 75 |
| 193 (120) | 175 | 150 | 125 | 105 | 90 | 80 | 70 | 60 | 55 | 50 |

AAAAASee § 22.627(b)(1)(iii). This table applies for antenna heights of 152 meters (500 feet) or less above average terrain. For antenna heights between those in the table, use the next higher antenna height. For distances between those in the table, use the next lower distance.

TABLE E–6.—MAXIMUM ERP (WATTS) FOR CONTROL TRANSMITTERS (HAAT MORE THAN 152 METERS)

| Distance to protected TV station in kilometers (miles) | Antenna height above average terrain in meters (feet) | | | | | |
|---|---|---|---|---|---|---|
| | 152 (500) | 305 (1000) | 457 (1500) | 610 (2000) | 762 (2500) | 914 (3000) |
| 261 (162) | 1000 | 501 | 282 | 170 | 110 | 71 |
| 241 (150) | 400 | 209 | 110 | 60 | 36 | 23 |
| 225 (140) | 225 | 102 | 50 | 28 | 16 | 10 |
| 209 (130) | 100 | 48 | 21 | 11 | 7 | 5 |
| 193 (120) | 50 | 19 | 9 | 5 | 3 | 2 |

AAAAASee § 22.627(b)(1)(iii). This table is for antenna heights of more than 152 meters (500 feet) above average terrain. For intermediate values of height and/or distance, use linear interpolation to obtain the maximum permitted ERP.

TABLE E–7.—MAXIMUM ERP (WATTS) FOR CONTROL TRANSMITTERS

| Distance to protected TV station in kilometers (miles) | Antenna height above average terrain in meters (feet) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 30 (100) | 46 (150) | 61 (200) | 76 (250) | 91 (300) | 107 (350) | 122 (400) | 137 (450) | 152 (500) |
| 108 (67) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 106 (66) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 750 |
| 105 (65) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 825 | 650 | 600 |
| 103 (64) | 1000 | 1000 | 1000 | 1000 | 1000 | 775 | 625 | 500 | 400 |
| 101 (63) | 1000 | 1000 | 1000 | 1000 | 440 | 400 | 350 | 320 | 300 |
| 100 (62) | 1000 | 1000 | 1000 | 525 | 375 | 250 | 200 | 150 | 125 |
| 98 (61) | 1000 | 700 | 450 | 250 | 200 | 125 | 100 | 75 | 50 |
| 97 (60) | 1000 | 425 | 225 | 125 | 100 | 75 | 50 | ..... | ..... |

See § 22.627(b)(2). This table applies to control transmitters in the Boston, Chicago, Cleveland, Detroit, Los Angeles, New York-Northeastern New Jersey, Philadelphia, Pittsburgh and Washington, DC urban areas. This table is for antenna heights of 152 meters (500 feet) or less above average terrain. For antenna heights between those in the table, use the next higher antenna height. For distances between those in the table, use the next lower distance.

[59 FR 59507, Nov. 17, 1994; 60 FR 9890, Feb. 22, 1995]

## 470–512 MHz TRUNKED MOBILE OPERATION

### § 22.651 470–512 MHz channels for trunked mobile operation.

The following channels are allocated for assignment to transmitters providing trunked public mobile service within the specified urban areas. All channels have a bandwidth of 20 kHz and are designated by their center frequencies in MegaHertz.

Houston

| | | | |
|---|---|---|---|
| 488.0125 | 491.0125 | 488.0875 | 491.0875 |
| 488.0375 | 491.0375 | 488.1125 | 491.1125 |
| 488.0625 | 491.0625 | 488.1375 | 491.1375 |

New York-Northern New Jersey

| | | | |
|---|---|---|---|
| 473.0125 | 479.0125 | 473.1625 | 479.1625 |
| 473.0375 | 479.0375 | 473.1875 | 479.1875 |
| 473.0625 | 479.0625 | 473.2125 | 479.2125 |
| 473.0875 | 479.0875 | 473.2375 | 479.2375 |
| 473.1125 | 479.1125 | 473.2625 | 479.2625 |
| 473.1375 | 479.1375 | 473.2875 | 479.2875 |